# City of Lincoln

# Technical and Aesthetic Guidelines for Small Cell Wireless Facilities


Public Works and Community Development Departments
May 2020

# City of Lincoln Guide to Technical and Aesthetic Standards for Small Cell Wireless Facilities

The City of Lincoln has established these technical and aesthetic standards (Standards) to govern access to and use of the public right-of-way and City structures in the right-of-way by wireless carriers, infrastructure companies, or others (collectively referred to as "Applicants" for installation of "Small Wireless Facilities" and associated equipment (commonly called "small cells"), as defined by the Federal Communications Commission (FCC).

These Standards are intended to ensure the safety of the general public and City employees while protecting the City's ability to manage the public rights-of-way and the community's interest in preserving the unique aesthetic beauty that significantly contributes to the quality of life and local economy in Lincoln.

These Standards are part of an evolving process and are intended to address the ongoing development of commercial wireless communications technology in conformity with the provisions of the FCC Order "Accelerating Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment" (the Order). The Standards are intended to be amended over time to respond to ongoing technological and regulatory changes.

All Applicants must follow the most current version of the National Electrical Safety Code (NESC), California Public Utility Commission (CPUC) guidelines, applicable engineering practices and standards, FCC Rules and Regulations, and other federal, state, and local standards and codes. These Standards use national safety standards and federal rules as a foundation, but the City's unique operational requirements, as well as local aesthetic requirements, also have been incorporated into these Standards.

## I. Pre-Application Requirements

The Applicant must have an executed Master License Agreement for attachments to City poles on file with the City. Any application submitted without an executed Master License Agreement may be deemed incomplete by the City until and unless the Applicant satisfies this requirement.

## II. Application Requirements

The deployment of Wireless Facilities in the public right-of-way shall be targeted to be installed and confined to areas that will minimize visual blight within the City. To the maximum extent possible, deployment shall by focused to the installing of facilities within the following priorities.

**a.** Right-of-way of City roadways

**b.** Commercially zoned areas

**c.** Downtown and Commercial

**d**. Residential along through streets

Residentially zoned areas, historic districts, and near schools (upon showing that there are no suitable sites in categories [a-c] that are suitable to address the carriers target. As a general rule, the City prefers facilities in locations on or along streets classified for higher traffic volume, with arterials as the most preferred and local roads as the least preferred. In situations where the public rights-of-way divides one or more zoning districts, the proposed site location will be classified according to the zoning of the nearest privately owned parcel.

Wireless Facilities shall be attached to a pre-existing support structure or a similar structure replacing an existing structure. If the Applicant can demonstrate with objective, fact-based evidence that no co-location opportunities exist in the area where it demonstrates a need for a Wireless Facility or at the direction of the Lincoln Public Works Director, the Applicant may consider the option of installing a new mounting structure for the Wireless Facility.

The City has established an order of preference for Wireless Facility installation configurations. The most preferred types are those that have the lowest incremental impact and use existing resources. The City's three acceptable wireless facility design configurations in order of preference are as follows:

1. Co-locating on an existing or replacement streetlight
2. Installing a new steel pole in the public right-of-way
3. Co-locating on an existing utility poles

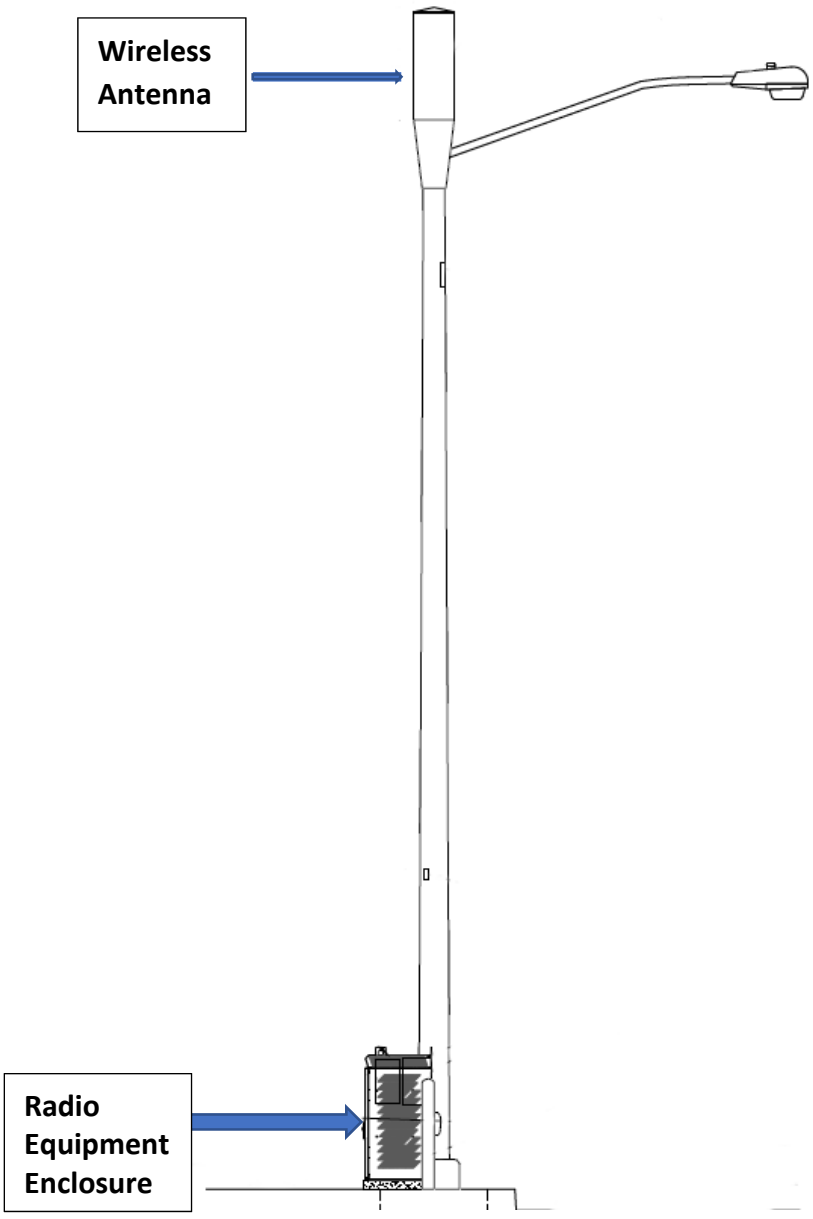
The following sections describe acceptable applications design configurations for (a) collocating/replacing existing City streetlights, (b) installing a new steel pole in the public right-of-way, and (c) co-locating/upgrading an existing utility pole.

### a. Application for an Existing or Replacement City-Owned Streetlight Structure (Figure 1)

If the Applicant is attaching to an existing or replacement City streetlight, the Applicant shall comply with the standards, processes, and permitting requirements of the City to place the Wireless Facility in the right-of-way.

If the existing City-owned streetlight is not structurally suitable for co-locating the wireless equipment, the Applicant shall replace the existing streetlight with a new streetlight that is structurally consistent with all engineering specifications established by the City of Lincoln Public Works Director and aesthetically consistent with all neighboring streetlights.

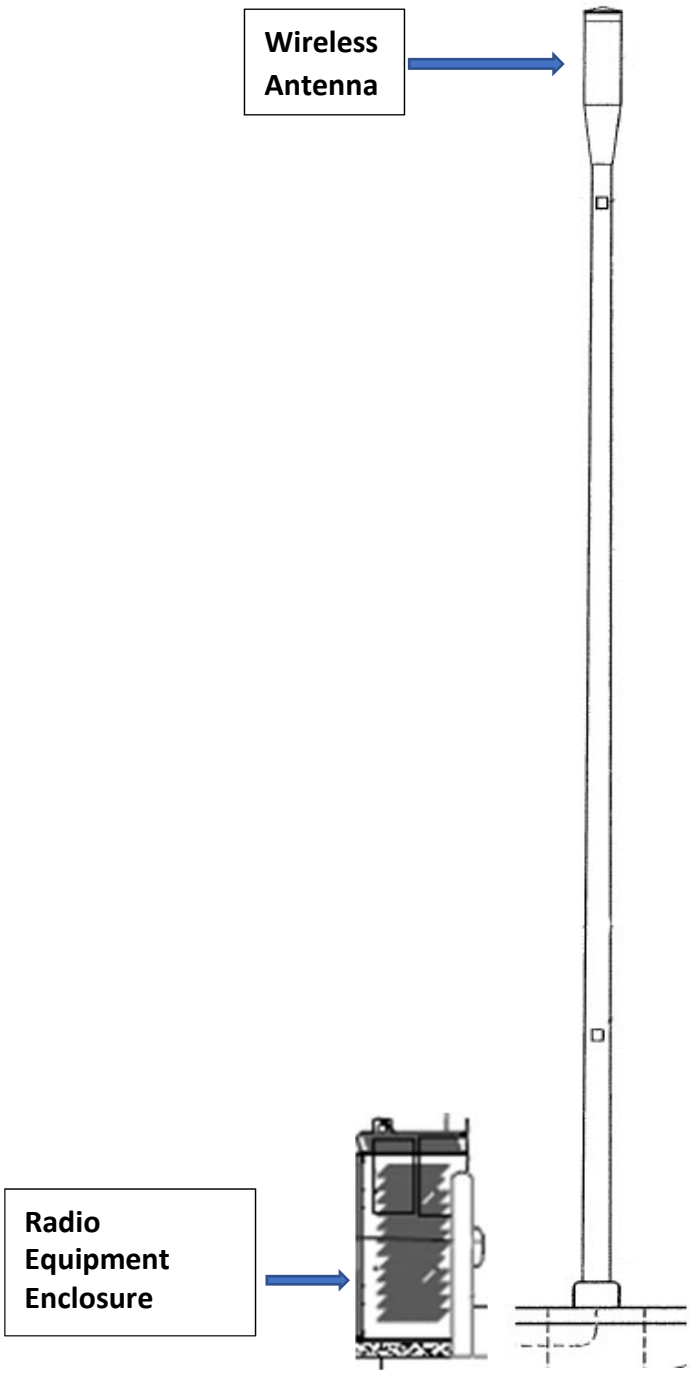
**Figure 1: Example - Small Cell Facility Mounted on a City-Owned Light Pole**




### b. Application for a New Pole (Figure 2)

For Applicants installing a new, self-supporting steel or precast concrete pole, the preference is to use a steel or precast concrete pole that is compatible with the base mount, taper, and color of existing City streetlight poles within the immediate vicinity as the proposed New Pole, as well as with Americans with Disabilities Act (ADA) requirements or space restrictions in the right-of-way. New wooden poles are prohibited.

**Figure 2: Example - Small Cell Facility Mounted on Standalone**



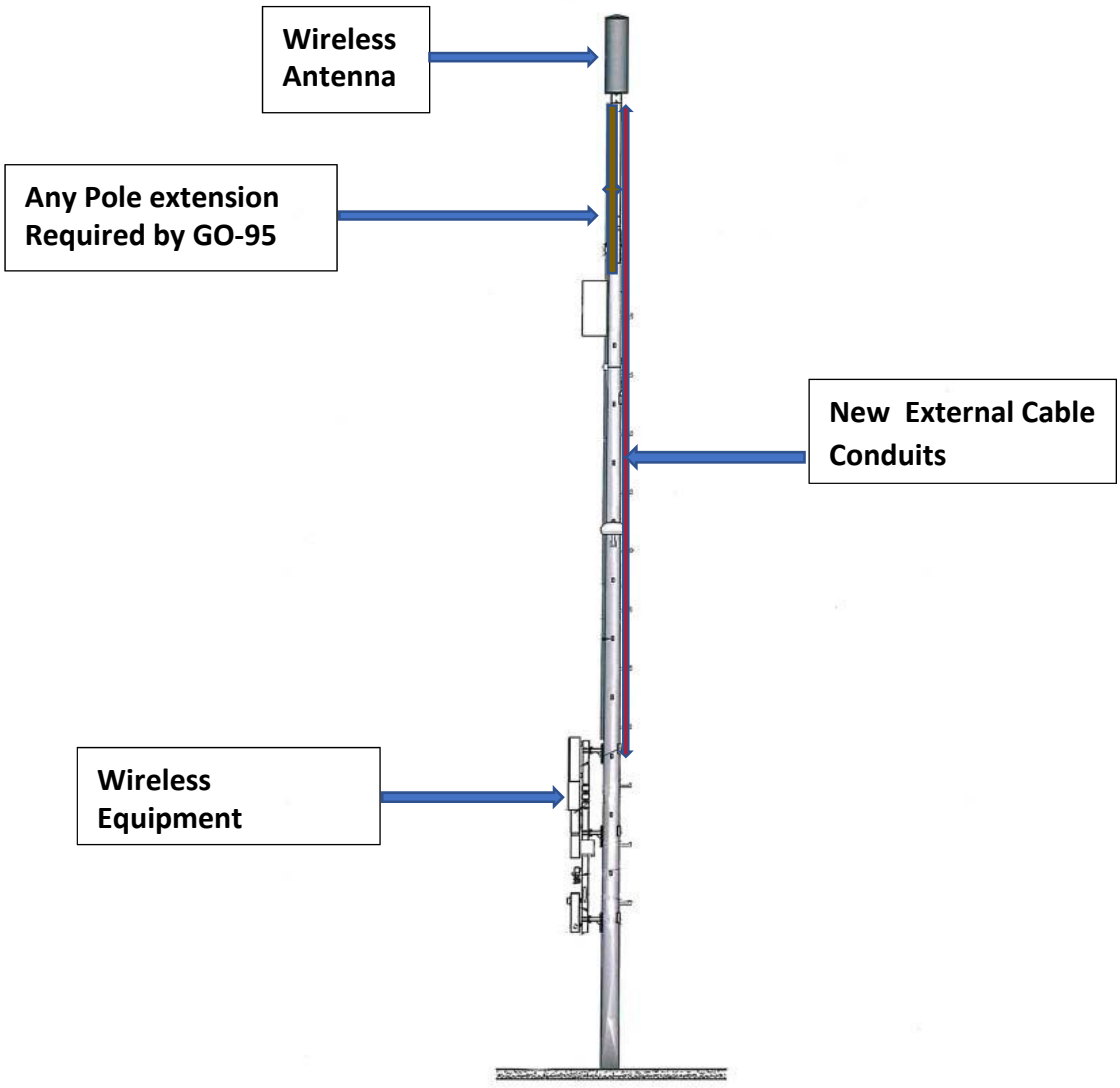

### c. Co-locating on Existing Utility Poles (Figure 3)

The installation of wireless facilities is acceptable when the hardware is current present in the public rights-of-way. Where permitted, pole-mounted small cell facilities may include all or some of the following components equipment:

- Antenna mounted at pole top

- Radios, fiber terminations, RF diplexers, and transmission cables
- Equipment concealment/security covering
- Electric power meter and power disconnect switch
- Off-pole equipment enclosures

**Figure 3: Example - Small Cell Facility Mounted on a Utility Pole**




## III. General Technical and Aesthetic Requirements and Guidelines

This section describes the City's technical and aesthetic requirements for small cells. These include the following:

- In all cases, the placement of small cells shall be consistent with existing structures and

aesthetics, in harmony with the surroundings, and as unobtrusive as possible. For example, in areas with decorative light poles, small cells on light poles must be consistent with the existing decorative light poles, calling for a design that is comparable in scale and incorporates the design characteristics of those poles.

- Any contractor used by the Applicant must meet the requirements set out as part of the encroachment permit by the Public Works Department and must obtain the required orientation and training from the Department prior to performing construction and maintenance of poles.
- Wireless Facilities shall not be installed on City poles containing controls for fire alarms, police signals, or traffic signals.
- Wireless Facilities shall not be placed where they conflict with City capital projects.
- The City prefers that Wireless Facilities not be located on streetlight poles with traffic signs mounted on them. If an Applicant submits an application for attaching to a streetlight pole with a traffic sign, it must demonstrate that it is not technically feasible to use another pole.
- Wireless Facility poles shall be installed with a minimum 50-foot setback from residential buildings and a minimum 20-foot setback from commercial buildings.
- Wireless Facility poles shall be installed with a minimum 350-foot setback from the property line of public and private schools.
- Wireless Facilities used by an individual wireless carrier shall be installed with a minimum spacing of 600 feet between sites in residential areas.
- Up to two Wireless Facilities may be installed at an intersection, each on a different corner. Two Wireless Facilities at an intersection may not be operated by the same Wireless Carrier.
- A distinct marker (tag) shall be placed on Wireless Facilities that will allow for ready identification of the type of attachment, its owner, and contact information for the network operations center. The marker shall be limited in size to a 3-inch by 2-inch plate.
- No Wireless Facilities shall extend over the roadway or any property line beyond the public rights-of-way.
- For non-wooden poles, all cables shall be placed inside and not visible on the outside.
- All top-mounted antennas must be placed in-line or shall be flush-mounted with the pole consistent to standards set by the pole owner.

- When antennas are placed in-line with the pole, antennas must have a smooth cylindrical shape.
- All Wireless Facilities shall utilize stealth and concealment methods to limit their visual impact when feasible. Stealth features should include blending with the environment, concealing the equipment and antennas, and limiting the overall size; including the height.
- The City prefers the use of stealth design elements, such as shapes and colors that match surrounding infrastructure and minimize adverse visual impacts.
- The Applicant shall minimize the size and aesthetic difference between a replacement structure and the original pole or structure.
- A replacement pole to change the maximum elevation of the pole is limited to a one-time change/replacement to conform to safety requirements of CPUC GO-95.
- Antenna attachments are limited to the following types and dimensions:
    - Small cell canister antennas mounted on utility poles are limited to maximum height of 48" and a maximum diameter of 18".
    - Small cell canister antennas mounted on streetlights or standalone steel utility poles are limited to maximum height of 24" and a maximum diameter of 18".
- Any equipment cabinet:
    - Must not exceed a maximum volume of 20 cubic feet, a maximum width of 26 inches, and a maximum height of 48 inches, not including any pedestal needed to meet other standards or back-up batteries.
    - Must be painted or screened to be the same color or design approved by the City.
    - Ensure ADA accessibility path of travel
- Pole mounted equipment:
    - Must be flush-mounted to the pole.
    - Must not exceed a maximum volume of 12 cubic feet and a maximum width of 2 feet; cabinets that are non-rectangular in shape must be comparable or less in volume and visual impact.
    - Must be a minimum of 8 feet above ground level.
    - Must be on the side of the pole facing away from the roadway.

- Surface-mounted cabinets must be on a concrete slab, and where possible must be placed next to existing pedestals and cabinets (for example, near a traffic signal).
- Surface-mounted cabinets must be the same color as other nearby pedestals or cabinets. Where there are no other nearby pedestals or cabinets, the cabinets should be the same color as the pole housing the antenna or with City-approved wrapping.

### a. Replacement of Existing Streetlight Poles

A replacement streetlight pole shall be installed in substantially the same or same location as the original pole location, as close as possible to the line between the residential or business lots. It shall serve the purpose of the original pole (i.e., lighting) while also serving as a supporting structure for the Wireless Facility.

### b. Replacement Utility Pole

Any new City-owned utility pole shall be installed within 2 feet of the existing pole location. The new pole shall serve the same functionality of the original pole while also serving as a supporting structure for the Wireless Facility.

A pre-existing utility pole shall be removed within 60 days after a replacement utility pole is placed in service.

### c. Utility Pole Standards

The technical standards of the utility pole owner apply. In addition, the City requires the following:

#### 1. Riser Conduits

Riser cables to connect antennas and antenna accessory equipment, backhaul services, and power lines on wooden utility poles shall be in conduit on the side of the pole facing away from the roadway, with a limit of two pole-length conduits, each with a 2” maximum diameter.

#### 2. Conduit Requirements

Conduit shall be a neutral color or a color matching the pole. No riser cable slack shall be stored externally. All slack shall be stored in junction boxes or equipment cabinets or on snowshoes on the aerial cable.

#### 3. Cabinets

Cabinets are allowed on the side of wooden utility poles facing away from the roadway.

## IV. RF Exposure

Applicants shall comply with all provisions and guidelines of the FCC’s OET Bulletin 65, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields”

(FCC OET 65 Edition 97-01), as may be amended from time to time. In all cases, Applicants shall submit a report certifying with the methodology defined in FCC OET Bulletin 65 for each Wireless Facility installation. The following elements, at a minimum, must be contained within the report:

- A statement of compliance
- Date of the report
- Date of statement of compliance
- Pole identification number proposed for the Wireless Facility installation
- Applicant's site or identification number for the Wireless Facility installation
- Geographic coordinates of the proposed pole
- Manufacturer's rated RF output power of each radio
- Radiation pattern in both vertical and horizontal plane
- Calculation of maximum RF exposure power within 6 feet of ground level and at antenna level up to 50 feet from the site.
- Location of the applicable signage with above-ground-level height listed

### a. RF Signage Requirements

Approved signage compliant with FCC OET Bulletin 65 shall be posted at each pole or streetlight pole hosting a Wireless Facility, and/or at multiple locations on such pole structure as required by FCC OET Bulletin 65.

The RF signage shall comply with the appropriate and predetermined exposure level applicable to the "General Public," "Occupational Worker[s]," and "Specialized Worker[s]" as shown in Figure 4 below. All signage shall be 8 inches x 12 inches and made of weather-, corrosion-, and ultraviolet- (UV) resistant materials.

**Figure 4**


**General Public** | **Occupational Worker** | **Specialized Worker**

### b. Emergency RF/ Power Shut-Off

Each approved Wireless Facility shall have a clearly marked disconnect switch adjacent to the electronics cabinet and located outside areas that exceed RF exposure limits. Once the shut-off switch is placed in the open position, the electronics equipment related to the installation shall not be energized. Additionally, no RF transmissions shall be emitted by any antenna related to the installation.

If the City determines that the Wireless Facility is interfering with public safety communications, the City at its sole discretion may shut off the Wireless Facility using the power shut-off and notify the owner.

### c. RF Frequencies of Operation

Small cell facilities shall only transmit or receive frequencies that are licensed by the FCC to the Applicant or to the carrier the Applicant represents. In the event the facility owner desires to add another carrier or change the carrier network using the Wireless Facility, the Applicant shall notify the City in writing of the change in wireless carrier, antenna (type or orientation) operating wireless band and increase in effective radiation power in any wireless band.

## V. Backup Power

Battery backup power devices may be installed with a transfer switch to prevent back-feeding into the electrical system. No other types of permanently installed (solar/generator) backup power shall be permitted.

## VI. Lighting and Noise

- No lighting is allowed on Wireless Facilities; if there are lights on the supplied equipment, they must be covered, removed, or deactivated.
- Wireless Facilities may not create noise greater than 65 dBA measured at 25 feet from the device.

## VII. Inventory of Streetlights

The Applicant shall maintain, within or near the City, an inventory of new light poles of the same design, size, and color as the new light poles that have been installed to ensure that new light poles may be promptly replaced in the event of a failure of a new light pole whether caused by the Wireless Facilities or by any other event, including an Act of God. The inventory shall be the largest whole number of new light poles equal to 10 percent of the number of new light poles constructed.

## VIII. Wireless Siting Application Design Documentation Standards

### a. General

All design documentation shall be submitted with an application and shall fully depict the scope of work to be performed by the Applicant (e.g., a wireless provider applying for a lease to place a Wireless Facility in the public right-of-way).

The Applicant shall indicate the design of the support pole, the Wireless Facility, and any other attachments (such as fiber demarcations, battery backup, and power meters) in the design documentation. Design documentation shall include any handholes, manholes, pedestals, demarcation enclosures, splice cases, and duct surrounding the Wireless Facility and illustrate how the backhaul and power will interconnect with the Wireless Facility.

Design documentation shall be specific to the design with no handwritten or superimposed annotations other than the Professional Engineer's signature and stamp where required. Design documentation containing strictly generic typicals will not be accepted. Design documentation shall be original plotted digital renderings created with computer-aided design software and presented in PDF file format. Design documentation of poor visual quality (as determined by the City reviewer) will be rejected.

### b. Paper Size

All design documentation shall be legible when printed according to the ANSI B standard for 11 inches x 17 inches. Drawings may be submitted in a larger, ANSI D format (i.e., 22 inches x 34 inches) but must contain an accurate alternate scale when printed at 11 inches x 17 inches. Architectural sizes (i.e., ANSI A and ANSI C) are not acceptable size formats.

### c. Abbreviations

All annotations, call-outs, notes, and descriptive text shall be in plain language. If abbreviations are used to promote clarity in the design documentation, the Applicant shall follow the City's Department of Public Works engineering design manual.

### d. Line Weights and Annotations

Descriptions of existing aboveground features on plan view and profile view sheets shall have a consistent line weight. Descriptions of existing belowground utilities and features shall have a consistent line weight that is lighter than existing aboveground features. All features and components of the proposed Wireless Facility—as opposed to existing conditions—shall have a consistent, heavier line weight than existing aboveground features. All annotations for the proposed Wireless Facility shall be bolded and noticeably heavier than other annotations on the plan and profile sheets.

A plan sheet example with suitable line weights and annotations is shown in Figure 5. A sample profile sheet with suitable line weights and annotations is shown in Figure 5 (below).

**Figure 5: Sample Plan Sheet with Suitable Line Weights and Annotation[3]**

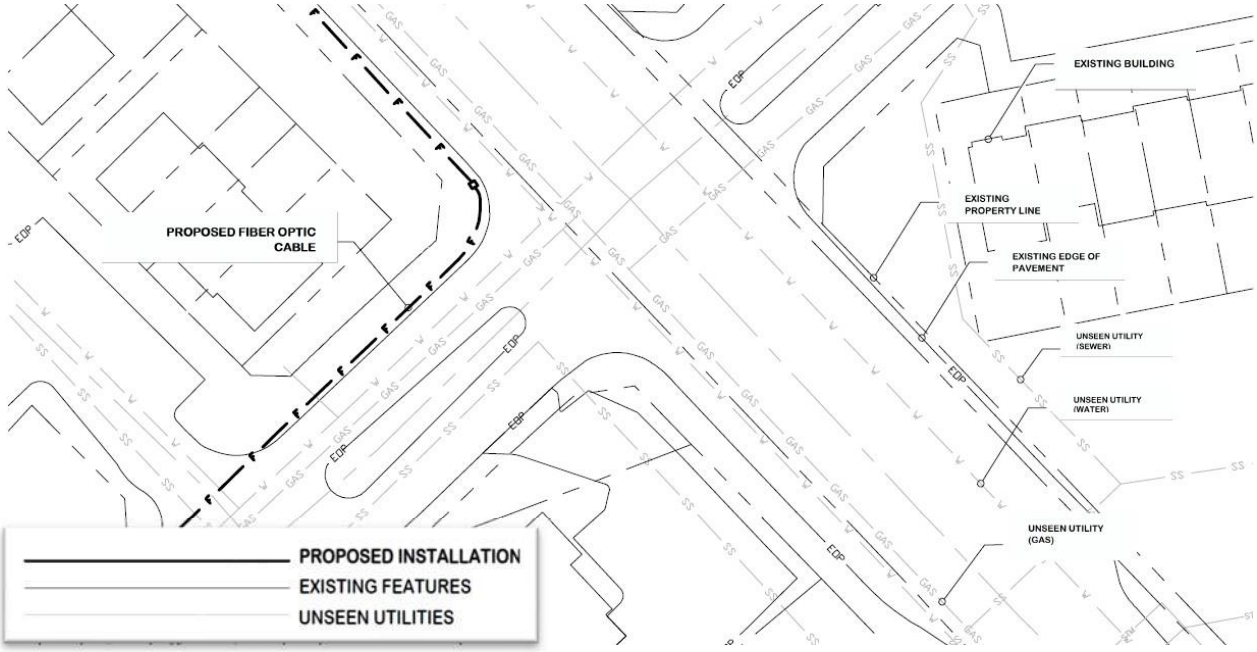
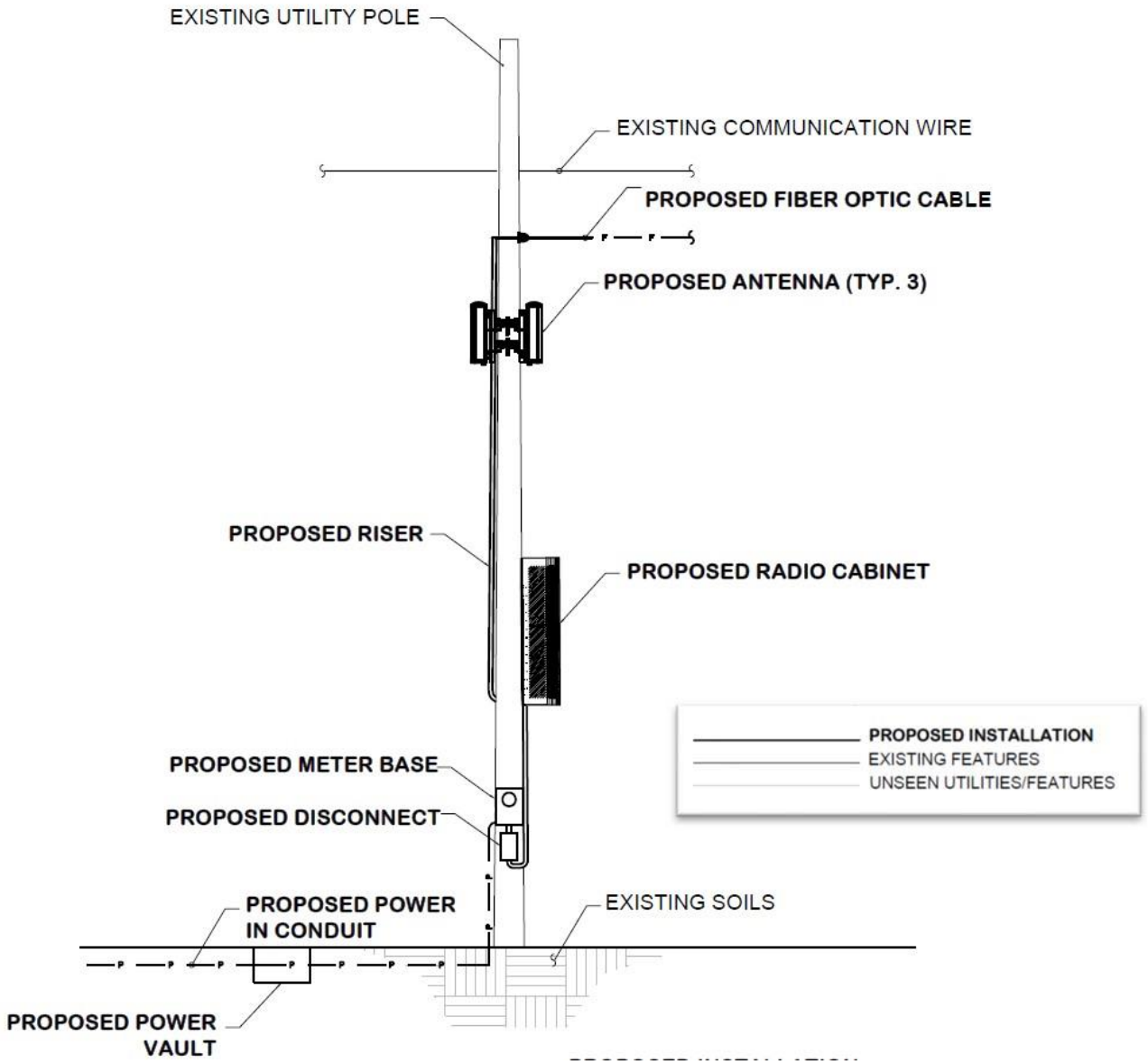


**Figure 5: Sample Profile of Acceptable Line Weighting and notation**




### e. Required Sheets and Information

Design documentation shall include, at a minimum, the following sheets for all types of applications except for Wireless Facility removal:

- Title
- Plan
- Profile

- Equipment
- Traffic control plan
- Typical (optional)

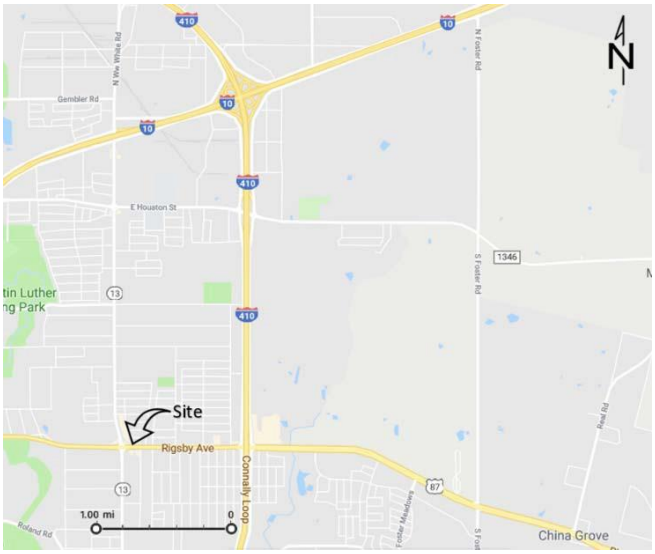
Applications to remove a Wireless Facility shall include a title sheet, a list of items that will be removed, traffic control plans, and a description of proposed restoration.

### 1. Title Sheet Requirements

The title sheet shall include the following items:

- Road name and number
- Applicant name
- Contractor name or names
- Pole owner name or names
- Equipment owner
- Applicant's site name and/or identifier number
- Full address of proposed Wireless Facility location (if none available, use closest address to assist the reviewer in finding the site)
- Historic district name, if applicable
- Latitude and longitude expressed in degree/decimal format (e.g., XX.XXXXXX) to the NAD83 standard and accurate to ±1 meter.
- Email and phone number for the Applicant's engineer
- Email and phone number for the Applicant's single point of contact

**Figure 6: Sample 5-Square-Mile Area Map**




- A list of applicable codes and applicable engineering standards (most recent version) with which the application complies
- Sheet index (table of contents) listing only submitted sheets
- Seal and signature from a State of California – registered Professional Engineer (P.E.)

## 2. Requirements for Plan Sheets

The Plan sheets shall accurately depict existing features that apply, such as:

- State roads and interstates (name and number)
- City and municipal roads (name)
- Toll roads (name)
- Private roads
- Travel lanes with traffic direction arrows
- Clear zones
- City rights-of-way and other rights-of-way and property lines
- Sidewalks and accessibility ramps
- Bike trails/lanes/paths

- All existing visible features, street furniture, and structures within the City rights-of-way
- Property addresses for parcels abutting the City rights-of-way
- Area zoning boundaries and indication of the zone type, if any (e.g., residential, mixed-use, commercial, industrial)
- Premises outlines with address numbers, if applicable
- Existing underground utilities
- Visible underground utility appurtenances (e.g., valves, fire hydrants)
- Annotation to identify surface type (e.g., pavement, grass, bituminous)
- Hydrology/flood plains
- Stormwater management and culverts
- North arrow indication
- Recorded easements
- Limits/boundary of construction
- Notes to identify method of construction (if not explained on a topicals sheet)
- Reference to any applicable detail illustrations on the plan sheet or a separate topicals sheet
- Any structure proposed to be installed or replaced
- Two color photos of the proposed Wireless Facility location (with approximate placement identified) taken during a field survey conducted within 90 days of the date of the application submittal; internet street-view photos are not acceptable, the size of the photo shall be no less than 3 x 4 inches when printed on an 11 x 17-inch sheet, photos taken shall show view in line and perpendicular to direction of travel of right-of-way

Plan sheets may have aerial imagery as the base layer. The Applicant's P.E. shall confirm that the aerial imagery is suitable to depict current conditions as related to the application. If a plan sheet with aerial imagery is used, an additional plan sheet of the same perspective, orientation, scale, and detail will be required without the imagery.

Plan sheets shall include the dimensions of all setbacks, offsets, and road widths related to the proposed Wireless Facility. Dimensioning should include but not be limited to:

- Road and City right-of-way widths
- Distance from existing and proposed underground facilities to the City right-of-way and edge of pavement
- Distance from hydrology and flood plains to proposed facilities
- Clear zone width and offset to proposed facilities
- Widths of sidewalks, accessibility ramps, bike trails, bike lanes, and bike paths
- Setback to premises

Plan sheet features shall be drawn to scale except for symbols. Symbols are only to be used to preserve clarity (i.e., an existing 8-inch water line does not need to be drawn to scale). The main plan sheet scale must be in the range from 1:30 (inch: foot) to 1:50. Detailed illustrations can be added to show greater clarity using a larger scale (e.g., 1:10 or 1:5).

### 3. Profile Sheet Requirements

A profile sheet shall accurately depict the following items:

- View direction (facing)
- The entire dimension of the pole (new/proposed/existing)
- Existing structure view, if the proposed Wireless Facility will replace an existing structure
- Proposed structure view, or two different adjoining views (e.g., north and west) if it is a new structure
- All attached Wireless Facility equipment (e.g., antenna, ancillary equipment)
- Foundation view or reference to typical sheet for proposed foundations
- Buried pole depth for new or replaced pole without foundation
- Proposed hand boxes, vaults, and hand holes
- Proposed underground conduits (within 10 feet of the network support structure)
- Grounding detail or reference to typical page

- Proposed ground-based enclosure
- Roadway features, including driveways, ramps, and sidewalks, to verify pole location will not interfere with proposed Improvements
- Minimum depth of cover for proposed power and communications conduit
- Offset from City right-of-way line to power

All the following items shall be dimensioned:

- Antenna height above pole
- Pole dimension at the base
- Distance from City right-of-way line
- Antenna and cabinet offset from pole
- Overall height of the pole above grade
- Vertical clearance of any adjacent overhanging roadway
- Ground-based enclosures and height above grade
- Pole-mounted enclosures and height above grade

### 4. Equipment Sheet Requirements

Equipment sheets are specialized typical detail sheets that tabulate cubic volume for a Wireless Facility. An equipment sheet shall accurately include each of the following that apply:

- Plan view and profile view, or multiple profile views, or combined plan view and profile view (isometric) of any visible component with a measurement greater than 6 inches
- List of external components separately in typical detail
- Length, width, and depth in inches or feet and inches for any length greater than 10 feet
- Manufacturer and model number
- Total cubic feet
- Each component shall be identified as an antenna, a Wireless Facility, or ancillary equipment. Each typical detail on the equipment sheet shall be numbered and labelled to reference the typical sheet. The use of borders around details is required.

### 5. Traffic Control Plans

The Applicant shall provide the City with a set of traffic control plans that fully detail the regulation of traffic on the adjacent roadway. The plans shall specify how traffic will be regulated before, during, and after any planned construction or maintenance related to the Wireless Facility. The traffic control plans shall conform to the most recent version of the California Department of Transportation Standard Plans Temporary Traffic Control Systems and Temporary Pedestrian Routes as approved by the Director of Public Works and may not be amended without the City's written consent.

### 6. Typical Sheet Requirements

A sheet of typical details can be part of the design documentation. Only one typical sheet shall be included per design documentation, and each typical sheet shall contain no more than eight individual details or illustrations to depict the scope of work related to the plan and profile sheets. Each typical detail shall be numbered and labeled to reference the typical sheet and specific individual details. The use of borders around typical details is required.